

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL ELECTRIFICATION ADMINISTRATION
TECHNICAL STANDARDS DIVISION

REPORT ON
RADIO INTERFERENCE INVESTIGATION
(NORTH CAROLINA 46 MADISON)

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REPORT ON RADIO INTERFERENCE INVESTIGATION
(NORTH CAROLINA 46 MADISON)

A. GENERAL

At the request of Mr. D. M. Robinson, Manager, French Broad Electric Membership Corporation, Marshall, North Carolina, and with the concurrence of Region 1, Engineering Division, a trip was made to North Carolina 46 Madison by two engineers from Technical Standards Division. The purpose of the trip was to locate and mitigate radio interference which had been the cause of numerous complaints for some sixty days. This trip also afforded an opportunity to field test a new experimental radio interference locator which was recently submitted to REA for examination and comment.

North Carolina 46 Madison had recently acquired the properties of North West Carolina Utilities which embraced the towns of Marshall, Mars Hill and Burnsville as well as considerable rural territory in that vicinity. The distribution system as originally installed was a 2300 volt delta system. It is now in the process of being renovated and rebuilt for 12450/7200 volt multi-grounded Y operation. In rebuilding the system in the town of Mars Hill, new insulators, hardware and transformers were used but the old weather-proof conductor was utilized.

Upon energization of the renovated system, serious radio interference developed which practically blanketed out radio reception within the town of Mars Hill. Repeated attempts to locate the sources of interference were made by cooperative personnel with little success.

Radio interference in the town of Burnsville had also become progressively worse during the past sixty days.

The REA engineers arrived at the cooperative's headquarters in Marshall at 12:00 noon, Wednesday, February 25, 1948, and were accompanied to Mars Hill by three of the cooperative's linemen. A quick survey of the distribution lines within the town was made using the lineman's truck equipped with a car radio with special meter for visual indication of the intensity of interference.

B. FINDINGS

Severe interference was found to exist throughout the town of Mars Hill. On closer examination it was found that several types of interference existed and that it was emanating from multiple sources.

A pole by pole examination was then made with the aid of the car radio and the experimental model of the Sprague interference locator. In areas where the interference level appeared unusually high the lineman climbed the poles to disconnect transformers, lightning arresters, and to check hardware, insulators, tie wires and connectors.

THE HISTORY OF THE
CITY OF BOSTON

1780

As the year 1780 was a year of great distress to the city of Boston, the citizens were afflicted with a severe winter, and the city was in a state of great poverty. The citizens were afflicted with a severe winter, and the city was in a state of great poverty. The citizens were afflicted with a severe winter, and the city was in a state of great poverty.

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The principal source of interference was found to be emanating from pin insulator ties that were wrapped over the old conductor weatherproofing which still remained on sections of the old conductor. Twenty-three such ties were found in the downtown area of Mars Hill. Each of these ties was a source of interference which produced a characteristically recognizable noise in radio receivers. This interference was being propagated throughout the town and produced standing waves which had confused the linemen in their many attempts to locate the source.

Other sources and potential sources of interference were found to be due to ground wires touching insulator pins, lightning arrester and cut-out brackets, loose hardware, loose connectors and poor splices. No line equipment was found to be faulty.

Strong interference of the clicking or "telegraphing" type was found in the vicinity of Mars Hill College. It had become particularly annoying to residents at the college. Its source was found to be in a stoker motor on a kitchen range in the college dining hall. A dishwasher motor was also found to be particularly noisy. Other minor sources of interference were found within the campus buildings.

At Burnsville many complaints of radio interference had been received but the linemen had been unable to locate the interference sources. Unfortunately, on Thursday, February 26 and on Friday when the investigating was concluded, the weather was inclement and moisture had suppressed most of the interference. However, the quiet lines afforded an opportunity to detect sources of radio interference originating in residences and business establishments.

The principal source of interference on consumers' premises was found to be fluorescent lamps. This type of interference is far more objectionable in rural areas than in urban areas because the characteristically low signal strengths from usually distant radio stations requires that radio receivers be operated at higher sensitivities. Many types of fluorescent lamp fixtures without adequate radio filter devices are now on the market throughout the country. These fixtures will invariably present radio interference problems in rural areas.

The car radio equipped with meter attachment proved quite successful in tracking down outdoor sources of interference. The experimental Sprague locator, because of its high sensitivity, proved very helpful in taking small comparative readings and in locating indoor sources of interference where a hand-portable unit was required. A separate report on the operation of the Sprague locator will be prepared.

C. REMEDIAL MEASURES TAKEN

At Mars Hill most of the faulty insulator ties were remade. This had to be accomplished with minimum outage time. Accordingly, eleven linemen were used to change out twenty-three faulty ties simultaneously. The outage time was held down to approximately fifteen minutes. While the lines were deenergized a number of loose connectors were tightened and several ground wires were pulled away from insulator pins, lightning arrester mounting brackets and cross arm braces.

At Burnsville, the fluorescent lamp sources of interference were pointed out to consumer complainants by demonstration of the "off-on" technique. The installation of filters on these lamps was recommended. It was also recommended that the local electrical appliance dealers be asked to refrain from selling fluorescent fixtures that are not equipped with adequate filters.

D. RESULTS OBTAINED

Of the approximately 30 sources of interference located on the high voltage lines of the distribution system, the remedial measures taken brought about a marked reduction in radio noise. Unfortunately the inclement weather during the last two days of the investigation temporarily suppressed most sources of interference. This prevented a check for additional sources which undoubtedly were present.

The remedial measures recommended for the faulty stoker motors, the faulty dishwasher motor and the unfiltered fluorescent lamps will eliminate these sources of trouble.

One favorable result of this investigation was that it afforded the cooperative's maintenance personnel an opportunity to acquire additional experience and techniques in locating power line and appliance sources of radio interference.

E. CONCLUSIONS

From this investigation the following conclusions may be drawn:

1. In rebuilding an old distribution system many new sources of radio interference are likely to develop unless the construction contractor uses extreme care in the use of available materials and workmanship.
2. Responsible engineers and inspectors should be especially mindful of potential sources of radio interference on new and rebuilt systems.
3. Existing types of radio interference locators, while extremely helpful and necessary, are not really locators at all but are merely radio interference detectors and indicators.
4. The need still exists for a device that will unfailingly locate and point directly to the source of radio interference. Manufacturers should be urged to develop such a device.
5. The need exists for indoctrinating maintenance personnel in efficient radio interference location techniques. This may be partially accomplished by the presentation of a series of up-to-date articles on the subject in technical publications and trade journals. Such articles should be written specifically for maintenance men who are responsible for the actual radio interference location work.

1. The Commission has received information from the Government of the United States of America that the Government of the United States of America is in the process of negotiating a loan with the Government of the United Kingdom of Great Britain and Northern Ireland for the purpose of financing the construction of a new bridge over the River Sever at the town of Worcester.

2. THE LOAN

It is the intention of the Government of the United States of America to negotiate a loan with the Government of the United Kingdom of Great Britain and Northern Ireland for the purpose of financing the construction of a new bridge over the River Sever at the town of Worcester. The loan is to be for a period of ten years and is to be repaid by the Government of the United Kingdom of Great Britain and Northern Ireland.

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3. THE BRIDGE

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